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**FUJITSU Storage ETERNUS Multipath Driver V2 (for Linux)  
Installation Information**

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## Correspondence of ETERNUS Multipath Driver 's Version Level and Patch

It is possible to update a version Level of ETERNUS Multipath Driver (hereafter referred to as "Multipath Driver") to a later one by applying a patch.

Example: When applying the patch T00812-20 to V2.0L10, the function is equal to V2.0L20.

The correspondence of version levels and patches is as follows.

### Multipath Driver's Version Level and Patch correspondence table

Version Level	Patch
V2.0L01	none
V2.0L02	none
V2.0L03	T00812-04
V2.0L10	T00812-07
V2.0L11	T00812-08
V2.0L12	T00812-12
V2.0L13	T00812-17
V2.0L14	T00812-19
V2.0L20	T00812-20
V2.0L21	T00812-22
V2.0L22	T00812-23
V2.0L23	none
V2.0L24	T00812-27
V2.0L25	T00812-28
the latest patch	T00812-28

## Supported Operating System (OS) Versions

The following tables show the version of Linux kernels supported by the Multipath Driver.

If you are going to install Multipath Driver newly, please install Multipath Driver product, don't reboot the system, and then apply the latest Multipath Driver patch. After that, please reboot the system.

### Multipath Driver for Red Hat Enterprise Linux v.4

Operating System	Linux Kernel Versions	Version Level
Red Hat Enterprise Linux AS (v.4 for x86)*1 Red Hat Enterprise Linux ES (v.4 for x86)*1	2.6.9-5.0.3.EL *3	V2.0L01 or later
Red Hat Enterprise Linux AS (v.4 for EM64T)*2 Red Hat Enterprise Linux ES (v.4 for EM64T)*2	2.6.9-11.EL (Update 1) *4	V2.0L02 or later
Red Hat Enterprise Linux AS (v.4 for Itanium)*2	2.6.9-22.EL (Update 2)	V2.0L03 or later
Red Hat Enterprise Linux AS (v.4 for Itanium)*2	2.6.9-34.EL (Update 3) *4	V2.0L03 or later
	2.6.9-42.EL (Update 4)	V2.0L10 or later
Red Hat Enterprise Linux AS (4.5 for x86)*1 Red Hat Enterprise Linux ES (4.5 for x86)*1 Red Hat Enterprise Linux AS (4.5 for EM64T) Red Hat Enterprise Linux ES (4.5 for EM64T) Red Hat Enterprise Linux AS (4.5 for Itanium)	2.6.9-55.EL	V2.0L11 or later
Red Hat Enterprise Linux AS (4.6 for x86)*1 Red Hat Enterprise Linux ES (4.6 for x86)*1 Red Hat Enterprise Linux AS (4.6 for EM64T) Red Hat Enterprise Linux ES (4.6 for EM64T) Red Hat Enterprise Linux AS (4.6 for Itanium)	2.6.9-67.EL	V2.0L12 or later
Red Hat Enterprise Linux AS (4.7 for x86)*1 Red Hat Enterprise Linux ES (4.7 for x86)*1 Red Hat Enterprise Linux AS (4.7 for EM64T) Red Hat Enterprise Linux ES (4.7 for EM64T) Red Hat Enterprise Linux AS (4.7 for Itanium)	2.6.9-78.EL *5	V2.0L13 or later
Red Hat Enterprise Linux AS (4.8 for x86)*1 Red Hat Enterprise Linux ES (4.8 for x86)*1 Red Hat Enterprise Linux AS (4.8 for EM64T) Red Hat Enterprise Linux ES (4.8 for EM64T) Red Hat Enterprise Linux AS (4.8 for Itanium)	2.6.9-89.EL *5	V2.0L13 or later
Red Hat Enterprise Linux AS (4.9 for x86)*1 Red Hat Enterprise Linux ES (4.9 for x86)*1 Red Hat Enterprise Linux AS (4.9 for EM64T) Red Hat Enterprise Linux ES (4.9 for EM64T) Red Hat Enterprise Linux AS (4.9 for Itanium)	2.6.9-100.EL *5	V2.0L21 or later

\*1 hugemem kernel is not supported.

\*2 largesmp kernel is not supported.

\*3 Only Itanium platform.

\*4 Only x86 or EM64T platform.

\*5 errata kernel is supported.

**Multipath Driver for Red Hat Enterprise Linux 5**

Operating System	Linux Kernel Versions	Version Level
Red Hat Enterprise Linux 5 (for x86) Red Hat Enterprise Linux 5 (for Intel64) Red Hat Enterprise Linux 5 (for Intel Itanium)	2.6.18-8.el5	V2.0L11 or later
Red Hat Enterprise Linux 5.1 (for x86) Red Hat Enterprise Linux 5.1 (for Intel64) Red Hat Enterprise Linux 5.1 (for Intel Itanium)	2.6.18-53.el5 2.6.18-53.1.21.el5	V2.0L12 or later V2.0L13 or later
Red Hat Enterprise Linux 5.2 (for x86) Red Hat Enterprise Linux 5.2 (for Intel64) Red Hat Enterprise Linux 5.2 (for Intel Itanium)	2.6.18-92.el5 *1*2	V2.0L13 or later
Red Hat Enterprise Linux 5.3 (for x86) Red Hat Enterprise Linux 5.3 (for Intel64) Red Hat Enterprise Linux 5.3 (for Intel Itanium)	2.6.18-128.el5 *2	V2.0L13 or later
Red Hat Enterprise Linux 5.4 (for x86) Red Hat Enterprise Linux 5.4 (for Intel64) Red Hat Enterprise Linux 5.4 (for Intel Itanium)	2.6.18-164.el5 *2	V2.0L14 or later
Red Hat Enterprise Linux 5.5 (for x86) Red Hat Enterprise Linux 5.5 (for Intel64) Red Hat Enterprise Linux 5.5 (for Intel Itanium)	2.6.18-194.el5 *2*3	V2.0L20 or later
Red Hat Enterprise Linux 5.6 (for x86) Red Hat Enterprise Linux 5.6 (for Intel64) Red Hat Enterprise Linux 5.6 (for Intel Itanium)	2.6.18-238.el5 *2	V2.0L21 or later
Red Hat Enterprise Linux 5.7 (for x86) Red Hat Enterprise Linux 5.7 (for Intel64) Red Hat Enterprise Linux 5.7 (for Intel Itanium)	2.6.18-274.el5 *2	V2.0L22 or later
Red Hat Enterprise Linux 5.8 (for x86) Red Hat Enterprise Linux 5.8 (for Intel64) Red Hat Enterprise Linux 5.8 (for Intel Itanium)	2.6.18-308.el5 *2	V2.0L22 or later
Red Hat Enterprise Linux 5.9 (for x86) Red Hat Enterprise Linux 5.9 (for Intel64) Red Hat Enterprise Linux 5.9 (for Intel Itanium)	2.6.18-348.el5 *2	V2.0L22 or later
Red Hat Enterprise Linux 5.10 (for x86) Red Hat Enterprise Linux 5.10 (for Intel64) Red Hat Enterprise Linux 5.10 (for Intel Itanium)	2.6.18-371.el5 *2	V2.0L22 or later

\*1 The kernel version 2.6.18-92.1.18.el5 or later is needed to use Multipath Driver on the server which has a SATA interface HDD.

\*2 errata kernel is supported.

\*3 Please refer to " Recovery from failure of update to Red Hat Enterprise Linux 5.5" , when a server cannot boot after updating OS to Red Hat Enterprise Linux 5.5. This happens when using V2.0L14 or earlier that doesn't support Red Hat Enterprise Linux 5.5.

**Multipath Driver for Red Hat Enterprise Linux 6**

Operating System	Linux Kernel Versions	Version Level
Red Hat Enterprise Linux 6 (for x86) Red Hat Enterprise Linux 6 (for Intel64)	2.6.32-71.el6	V2.0L21 or later
Red Hat Enterprise Linux 6.1 (for x86) Red Hat Enterprise Linux 6.1 (for Intel64)	2.6.32-131.0.15.el6	V2.0L22 or later
Red Hat Enterprise Linux 6.2 (for x86)	2.6.32-220.4.1.el6 *1	V2.0L22 or later
Red Hat Enterprise Linux 6.2 (for Intel64)	2.6.32-220.el6	
Red Hat Enterprise Linux 6.3 (for x86) Red Hat Enterprise Linux 6.3 (for Intel64)	2.6.32-279.el6	V2.0L22 or later
Red Hat Enterprise Linux 6.4 (for x86) Red Hat Enterprise Linux 6.4 (for Intel64)	2.6.32-358.el6	V2.0L22 or later
Red Hat Enterprise Linux 6.5 (for x86) Red Hat Enterprise Linux 6.5 (for Intel64)	2.6.32-431.el6	V2.0L22 or later

\*1 It is necessary to apply the Advisory ID RHSA-2012:0052-01.

### Multipath Driver for SUSE Linux Enterprise Server 9

Operating System	Linux Kernel Versions	Version Level
SUSE Linux Enterprise Server 9 for x86	2.6.5-7.191 (SP2)	V2.0L10 or later
SUSE Linux Enterprise Server 9 for EM64T	2.6.5-7.244 (SP3)	V2.0L03 or later
SUSE Linux Enterprise Server 9 for Itanium Processor Family	2.6.5-7.308 (SP4)	V2.0L12 or later

### Multipath Driver for SUSE Linux Enterprise Server 10

Operating System	Linux Kernel Versions	Version Level
SUSE Linux Enterprise Server 10 for x86	2.6.16.46-0.12 (SP1)	V2.0L12 or later
SUSE Linux Enterprise Server 10 for EM64T	2.6.16.60-0.21 (SP2)	V2.0L13 or later
SUSE Linux Enterprise Server 10 for Itanium Processor Family	2.6.16.60-0.54.5(SP3)	V2.0L20 or later
	2.6.16.60-0.85.1(SP4)	V2.0L22 or later

### Multipath Driver for SUSE Linux Enterprise Server 11

Operating System	Linux Kernel Versions	Version Level
SUSE Linux Enterprise Server 11 for x86	2.6.32.12-0.7 (SP1)	V2.0L21 or later
SUSE Linux Enterprise Server 11 for EM64T	3.0.13-0.27 (SP2)	V2.0L23 or later
	3.0.76-0.11 (SP3)	V2.0L25 or later



**Multipath Driver for Red Hat Enterprise Linux v.3\***

Operating System	Linux Kernel Versions	Version Level
Red Hat Enterprise Linux AS (v.3 for x86) Red Hat Enterprise Linux ES (v.3 for x86)	2.4.21-4.0.1.EL	V2.0L02 or later
	2.4.21-9.EL (Update 1)	
	2.4.21-15.EL (Update 2)	
	2.4.21-20.EL (Update 3)	
	2.4.21-32.0.1.EL (Update 5)	
	2.4.21-37.EL (Update 6)	V2.0L03 or later
	2.4.21-40.EL (Update 7)	
	2.4.21-47.EL (Update 8)	V2.0L10 or later
Red Hat Enterprise Linux AS (3.9 for x86) Red Hat Enterprise Linux ES (3.9 for x86)	2.4.21-50.EL	V2.0L12 or later
	2.4.21-57.EL	V2.0L13 or later
	2.4.21-60.EL	V2.0L14 or later
Red Hat Enterprise Linux AS (v.3 for EM64T) Red Hat Enterprise Linux ES (v.3 for EM64T)	2.4.21-27.0.2EL (Update 4)	V2.0L02 or later
	2.4.21-32.EL (Update 5)	
	2.4.21-37.EL (Update 6)	V2.0L03 or later
	2.4.21-40.EL (Update 7)	
	2.4.21-47.EL (Update 8)	V2.0L10 or later
Red Hat Enterprise Linux AS (3.9 for EM64T) Red Hat Enterprise Linux ES (3.9 for EM64T)	2.4.21-50.EL	V2.0L12 or later
Red Hat Enterprise Linux AS (v.3 for Itanium)	2.4.21-4.0.1.EL	V2.0L02 or later
	2.4.21-9.EL (Update 1)	
	2.4.21-15.EL (Update 2)	
	2.4.21-20.EL (Update 3)	
	2.4.21-32.EL (Update 5)	
	2.4.21-37.EL (Update 6)	V2.0L03 or later
	2.4.21-40.EL (Update 7)	
	2.4.21-47.EL (Update 8)	V2.0L10 or later

\* Multipath Driver V2.0L20 or later doesn't bundle the driver for Red Hat Enterprise Linux v.3.

## Restrictions and Resolution schedule

The Multipath Driver has following restrictions on each OS.

### Common Restrictions for all OS

Restrictions	Resolution schedule
When using iSCSI or Dual Port SAS card to connect storage systems, do not use <code>iompadm change adapter</code> and <code>iompadm restart adapter</code> commands. Use <code>iompadm change controller</code> and <code>iompadm restart controller</code> commands instead.	TBD

### Red Hat Enterprise Linux AS v.4, Red Hat Enterprise Linux ES v.4

Restrictions	Resolution schedule
The hot deletion of LUs, paths and disk storage systems cannot be executed.	TBD
The hot addition of paths and disk storage systems is not supported.	TBD
The hot addition of LUs using PG-FCD101, PG-FCD102, or QLogic FC cards cannot be executed.	TBD
The maximum number of LU which can be assigned to a LU Mapping and an Affinity Group is 255 when using the <code>mptsas</code> driver. This restriction is due to <code>mptsas</code> driver.	RHEL4.8 *

\* Red Hat Enterprise Linux AS 4.8 or Red Hat Enterprise Linux ES 4.8

### Red Hat Enterprise Linux 5

Restrictions	Resolution schedule
Don't run the <code>"service iscsi stop"</code> command and <code>"service iscsi restart"</code> command when using the <code>iscsi-initiator-utils</code> . Please run the <code>"mpdconfig -d"</code> command when logging out from storage systems by the <code>iscsiadm</code> command.	TBD
When iSCSI interface is used to connect storage systems, FC interface, FCoE interface and SAS interface must not be used to connect storage systems.	TBD
Even if a cable is connected after a server is started when <code>iscsi-initiator-utils</code> is used, LUs are not automatically recognized. Please follow the procedure to recognize LUs.  <ul style="list-style-type: none"> <li>·Get the information of recognized node by <code>"iscsiadm -m node"</code> command. (<code>"IP address:Port number Target name"</code> is displayed.)</li> <li>·Get the information of connection by <code>"iscsiadm -m node"</code> command. (<code>"IP address:Port number Target name"</code> is displayed.)</li> <li>·The unrecognized target is confirmed from the above result. Please run the following command. <code>"iscsiadm -m node -T &lt;unrecognized target name&gt; -p IP address:Port number --login"</code></li> </ul>	TBD
The iSCSI boot environment is not supported, when LVM is used.	TBD

## Red Hat Enterprise Linux 6

Restrictions	Resolution schedule
<p>Even if a cable is connected after a server is started when iscsi-initiator-utils is used, LUs are not automatically recognized. Please follow the procedure to recognize LUs.</p> <ul style="list-style-type: none"> <li>·Get the information of recognized node by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·Get the information of connection by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·The unrecognized target is confirmed from the above result. Please run the following command. "iscsiadm -m node -T &lt;unrecognized target name&gt; -p IP address:Port number --login"</li> </ul>	TBD
In the iSCSI boot environment, do not run the dracut command with "-hostonly" option to make an initramfs file.	TBD

## SUSE Linux Enterprise Server 9

Restrictions	Resolution schedule
The hot deletion of LUs, paths and disk storage systems cannot be executed.	TBD
The hot addition of paths and disk storage systems is not supported.	TBD
The hot addition of LUs using PG-FCD101, PG-FCD102 or QLogic FC cards cannot be executed.	TBD
The PCI Hot Plug (PHP) of a HBA under control of the Multipath Driver is not supported.	V2.0L11
Hot addition of LUs using iSCSI initiator on SUSE Linux Enterprise Server 9 Service Pack 3.	SLES9 SP4*
Don't run the "service iscsi stop" command and "service iscsi restart" command when using the iSCSI initiator.	TBD
When iSCSI interface is used to connect storage systems, FC interface must not be used to connect storage systems.	TBD
The iSCSI boot environment is not supported.	TBD

\* SUSE Linux Enterprise Server 9 Service Pack 4

## SUSE Linux Enterprise Server 10

Restrictions	Resolution schedule
When using the open-iscsi on SUSE Linux Enterprise Server 10 Service Pack 2, download the 2.0.707-0.47 or later version of the open-iscsi from the web site of Novell.	-
<p>Don't run the "service iscsi stop" command and "service iscsi restart" command when using the open-iscsi.</p> <p>Please run the "mpdconfig -d" command when logging out from storage systems by the iscsiadm command.</p>	TBD
When iSCSI interface is used to connect storage systems, FC interface, FCoE interface and SAS interface must not be used to connect storage systems.	TBD

Restrictions	Resolution schedule
<p>Even if a cable is connected after a server is started when open-iscsi is used, LUs are not automatically recognized. Please follow the procedure to recognize LUs.</p> <ul style="list-style-type: none"> <li>·Get the information of recognized node by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·Get the information of connection by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·The unrecognized target is confirmed from the above result. Please run the following command. "iscsiadm -m node -T &lt;unrecognized target name&gt; -p IP address:Port number --login"</li> </ul>	TBD
<p>When kernel-kdumppae is used as a kdump kernel on SUSE Linux Enterprise Server 10 Service Pack 3 and a disk storage system is a dump output device, only one path is used as an access path.</p>	V2.0L21
<p>The iSCSI boot environment is not supported.</p>	TBD

**SUSE Linux Enterprise Server 11**

Restrictions	Resolution schedule
<p>Even if a cable is connected after a server is started when open-iscsi is used, LUs are not automatically recognized. Please follow the procedure to recognize LUs.</p> <ul style="list-style-type: none"> <li>·Get the information of recognized node by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·Get the information of connection by "iscsiadm -m node" command. ("IP address:Port number Target name" is displayed.)</li> <li>·The unrecognized target is confirmed from the above result. Please run the following command. "iscsiadm -m node -T &lt;unrecognized target name&gt; -p IP address:Port number --login"</li> </ul>	TBD
<p>The iSCSI boot environment is not supported.</p>	TBD
<p>The EFI boot environment is not supported.</p>	V2.0L23

## Supported Disk Storage Systems

Multipath Driver supports the following disk storage systems.

ETERNUS DX60  
 ETERNUS DX80  
 ETERNUS DX90  
 ETERNUS DX60 S2  
 ETERNUS DX80 S2  
 ETERNUS DX90 S2  
 ETERNUS DX100 S3  
 ETERNUS DX200 S3  
 ETERNUS DX200F  
 ETERNUS DX400 series  
 ETERNUS DX400 S2 series  
 ETERNUS DX500 S3  
 ETERNUS DX600 S3  
 ETERNUS DX8000 series  
 ETERNUS DX8000 S2 series  
 ETERNUS2000  
 ETERNUS4000  
 ETERNUS8000  
 ETERNUS3000  
 ETERNUS6000  
 ETERNUS GR series

The version of Multipath Driver which supports the disk storage system is as below.

### ETERNUS DX60, ETERNUS DX80, ETERNUS DX90

#### FC Interface

Disk Storage System	Version Level
ETERNUS DX60 *	V2.0L13 or later
ETERNUS DX80	V2.0L13 or later
ETERNUS DX90	V2.0L14 or later

\* V2.0L14 or later, the latest patch is needed for the Model Upgrade function.

#### SAS Interface

Disk Storage System	Version Level
ETERNUS DX60	V2.0L14 or later
ETERNUS DX80	V2.0L14 or later

#### iSCSI Interface

Disk Storage System	Version Level
ETERNUS DX60	V2.0L20 or later
ETERNUS DX80	V2.0L20 or later

### ETERNUS DX60 S2, ETERNUS DX80 S2, ETERNUS DX90 S2

Disk Storage System	Version Level
ETERNUS DX60 S2	V2.0L22 or later
ETERNUS DX80 S2	V2.0L22 or later
ETERNUS DX90 S2	V2.0L22 or later

**ETERNUS DX100 S3, ETERNUS DX200 S3, ETERNUS DX200F**

Disk Storage System	Version Level
ETERNUS DX100 S3 ETERNUS DX200 S3 ETERNUS DX200F	V2.0L25 or later

**ETERNUS DX400 series**

FC Interface

Disk Storage System	Version Level
ETERNUS DX400 series	V2.0L14 or later

iSCSI Interface

Disk Storage System	Version Level
ETERNUS DX400 series	V2.0L20 or later

**ETERNUS DX400 S2 series**

Disk Storage System	Version Level
ETERNUS DX400 S2 series	V2.0L22 or later

**ETERNUS DX500 S3, ETERNUS DX600 S3**

Disk Storage System	Version Level
ETERNUS DX500 S3 ETERNUS DX600 S3	V2.0L25 or later

**ETERNUS DX8000 series**

FC Interface

Disk Storage System	Version Level
ETERNUS DX8000 series	V2.0L14 or later

iSCSI Interface

Disk Storage System	Version Level
ETERNUS DX8000 series	V2.0L20 or later

**ETERNUS DX8000 S2 series**

Disk Storage System	Version Level
ETERNUS DX8000 S2 series	V2.0L22 or later

**ETERNUS2000**

FC Interface

Disk Storage System	Version Level
ETERNUS2000	V2.0L12 or later

SAS Interface

Disk Storage System	Version Level
ETERNUS2000	V2.0L13 or later

iSCSI Interface

Disk Storage System	Version Level
ETERNUS2000	V2.0L20 or later

## ETERNUS4000

### FC Interface

Disk Storage System	Version Level
ETERNUS4000 model 80, 100, 300, 500	V2.0L03 or later
ETERNUS4000 model 400, 600	V2.0L13 or later

### iSCSI Interface

Disk Storage System	Version Level
ETERNUS4000	V2.0L20 or later

## ETERNUS8000

### FC Interface

Disk Storage System	Version Level
ETERNUS8000 model 700, 900, 1100, 2100	V2.0L03 or later
ETERNUS8000 model 800, 1200, 2200	V2.0L13 or later

### iSCSI Interface

Disk Storage System	Version Level
ETERNUS8000	V2.0L20 or later

## ETERNUS3000

Disk Storage System	Version Level
ETERNUS3000	V2.0L01 or later

## ETERNUS6000

Disk Storage System	Version Level
ETERNUS6000	V2.0L01 or later

## ETERNUS GR series

Disk Storage System	Version Level
GR710 GR720 GR730 GR740 GR820 GR840	V2.0L01 or later

\* Multipath Driver doesn't support GR series on Red Hat Enterprise Linux 6 and SUSE Linux Enterprise Server 11.

## Connection Requirements

The tables below shows related products supported by Multipath Driver. For combination of servers and FC cards, please contact us.

## Hardware Requirements

Please use the same cards of product ID to configure a multipath access. If using the different cards of product ID, a multipath access cannot be configured. For example, the combination of a PG-FC202 and a PG-FC202 is good, but the combination of a PG-FC201 and a PG-FC202 is not good.

FC card

Server	HBA's	Version Level		
PRIMERGY	PG-FC105 *1	S26361-F2624-E1		
	PG-FC106	S26361-F2843-E1 S26361-F2843-E201	V2.0L02 or later	
	PG-FC107	S26361-F3141-L10 S26361-F3141-L210	V2.0L03 or later	
	PG-FC201	S26361-F3141-E1		
	PG-FC202(L)	S26361-F3306-L1 S26361-F3306-L201		
	PG-FC203(L) PY-FC201(L)	S26361-F3961-L1 S26361-F3961-L201	V2.0L13 or later	
	PG-FC204(L) PY-FC202(L)	S26361-F3961-L2 S26361-F3961-L202		
	PG-FC205(L) PY-FC211(L)	S26361-F3631-L1		
	PG-FC206(L) PY-FC212(L)	S26361-F3631-L2	V2.0L22 or later	
	PY-FC221(L) PYBFC221(L) PY-FC222(L) PYBFC222(L)	S26361-F4994-L501 S26361-F4994-E1 S26361-F4994-L502 S26361-F4994-E2	V2.0L24 or later	
	PG-FCD101 PG-FCD102	S26361-F3023-E1 S26361-F3023-E2 S26361-F3023-L1 S26361-F3023-L2	V2.0L02 or later	
	PG-FCD201	S26361-F3306-E601 S26361-F3306-L601	V2.0L11 or later	
	PG-FCD202 PY-FCD02	MC-FC82E	V2.0L13 or later	
	PRIMEQUEST	MC-08FC11		V2.0L01 or later
		MC-08FC31 MC-08FC41 MC-08FC51 MC-08FC61 MC-08FC71		V2.0L03 or later
MC-08FC81 MC-08FC91			V2.0L13 or later	
MC-0JFC11 MC-0JFC1L MC-0JFC21 MC-0JFC2L			V2.0L14 or later	
3rd party PC servers		Emulex FC cards QLogic FC cards		V2.0L02 or later
		Brocade FC cards		V2.0L20 or later

\*1 The PG-FC105 is supported only on Red Hat Enterprise Linux v.3.



SAS card

Server	HBAs	Version Level
PRIMERGY	PG-228B(L) PY-SC1Y0(L)	V2.0L13 or later
	PG-22DC(L) PY-SC2Z0	V2.0L22 or later *1
3rd party PC servers	LSI Logic 3Gb/s SAS cards	V2.0L13 or later
	LSI Logic 6Gb/s SAS cards	V2.0L22 or later *1

\*1 The earlier Multipath Driver doesn't support it even if applying the latest patch.

iSCSI \*1

Server	NICs	Version Level
PRIMERGY	NIC which PRIMERGY supports	V2.0L20 or later *2
3rd party PC servers	Intel Pro/1000MT etc.	

\*1 Multipath Driver supports the iSCSI interface on Red Hat Enterprise Linux 5.5 or later, SUSE Linux Enterprise Server 9 Service Pack 3 or later, and SUSE Linux Enterprise Server 10 Service Pack 2 or later.

\*2 The earlier Multipath Driver doesn't support it even if applying the latest patch. However, patch T00812-15 or later can support iSCSI interface only connected to ETERNUS2000 on SUSE Linux Enterprise Server 9 Service Pack 3 or later.

FCoE

Server	Card		Version Level
PRIMERGY	PG-292B(L) PY-CN202(L)	S26361-F3592-L2 S26361-F3592-L202	V2.0L20 or later
	PG-CND201	MC-CNA102E-F	
3rd party PC servers	Emulex CNA cards		

Topology

Interface	Topology	Version Level
FC	FC-AL	V2.0L01 or later
	Fabric	
SAS	Point-to-Point	V2.0L13 or later
	Fabric *1	V2.0L22 or later
iSCSI	Point-to-Point	V2.0L20 or later
	Switch	
FCoE	Switch	V2.0L20 or later

\*1: Only ETERNUS DX80 S2 or ETERNUS DX90 S2.

Virtualization Switch

Model Name	Version Level
VS900 model 300	V2.0L13 or later

\* When using VS900 model 300, please set the Max Throttle to 16.

## Software Requirements

### Clustering Software

Clustering Software	Version Level
PRIMECLUSTER	V2.0L01 or later
LifeKeeper for Linux v6 or later	V2.0L12 or later

## Virtualization Environments

Virtualization Environments	Running on Host OS	Running on Guest OS
Hyper-V	N/A	Not Supported
VMware	Not Supported	Not Supported
Linux Citrix Xen	Not Supported	Not Supported
Linux Native Xen	Supported *1	Not Supported
Linux KVM	Supported *2	Not Supported

\*1 Only Red Hat Enterprise Linux 5. When using Xen system on the Intel Itanium platform, Red Hat Enterprise Linux 5.1 or later is required.

\*2 Only Red Hat Enterprise Linux 6.

## Adapter Port Number and Connection Points

The `iompadm` command with "info" option shows attached disks information with adapter port number as the following example. The adapter port number means a connection point and is uniquely defined on each disk storage system. The figures below show the adapter port number of supported disk storage systems.

Example of V2.0L10 or later:

```
# /opt/FJSVmpd/bin/iompadm info
```

```
IOMP: vhba0
```

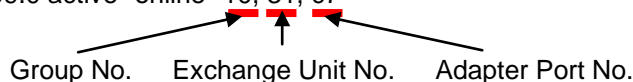
```
Element:
```

```
DISK: E6000- 000001-0000-0180 (sdf)
```

```
PATH:
```

```
sdf 0000:02:03.0 active "online" 0, 21, 87
```

```
sdf 0000:02:09.0 active "online" 10, 31, c7
```



Example of earlier than V2.0L10

```
# /usr/fjsvgrmpd/bin/iompadm info
```

```
IOMP: vhba0
```

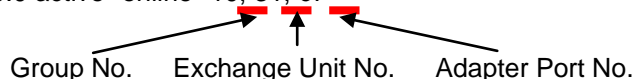
```
Element:
```

```
DISK: E6000-000001-4846-0180 (sdf)
```

```
PATH:
```

```
sdf 0000:02:03.0 active "online" 0, 21, 87
```

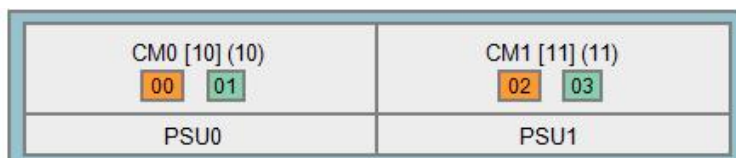
```
sdf 0000:02:09.0 active "online" 10, 31, c7
```



Note:

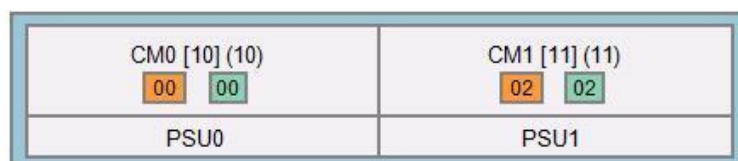
An adapter port number is different from a port number. Please refer to the User's Guide of a storage system to check a port number. The relation between the port number and the physical position of the port depends on a storage system.

### ETERNUS DX60, ETERNUS DX80 rear view (FC, iSCSI connection)



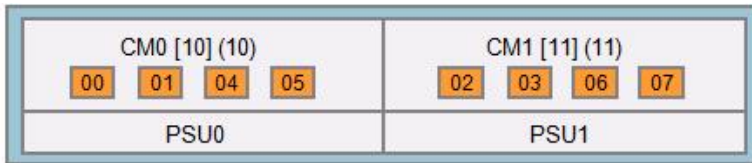
[ ] : Group No. ( ) : Exchange Unit No. 00 : Adapter Port No. 01 : When using 2 port CM

### ETERNUS DX60, ETERNUS DX80 rear view (SAS connection)



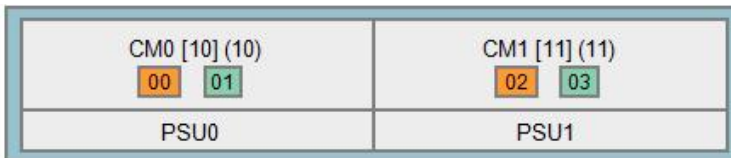
[ ] : Group No. ( ) : Exchange Unit No. 00 : Adapter Port No. 00 : When using 2 port CM

**ETERNUS DX90 rear view**



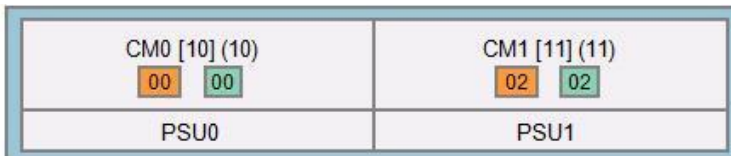
[ ] : Group No. ( ) : Exchange Unit No.   : Adapter Port No.

**ETERNUS DX60 S2 rear view (FC, iSCSI connection)**



[ ] : Group No. ( ) : Exchange Unit No.   : Adapter Port No.   : When using 2 port CM

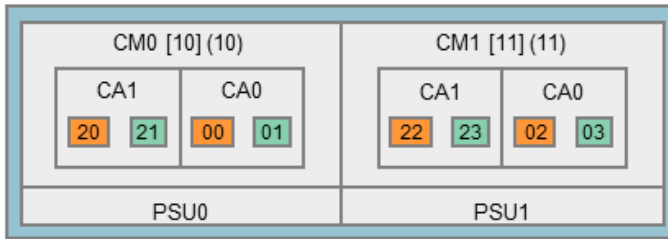
**ETERNUS DX60 S2 rear view (SAS connection)**



[ ] : Group No. ( ) : Exchange Unit No.   : Adapter Port No.   : When using 2 port CM

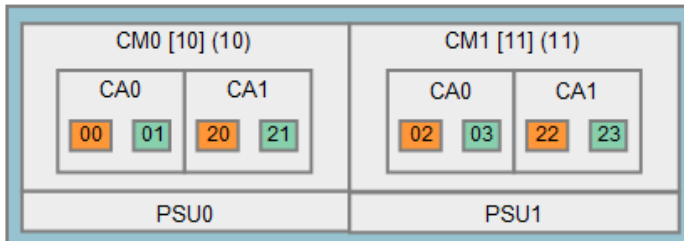
**ETERNUS DX100 S3 rear view**

When CA of FC is installed in the basic host interface



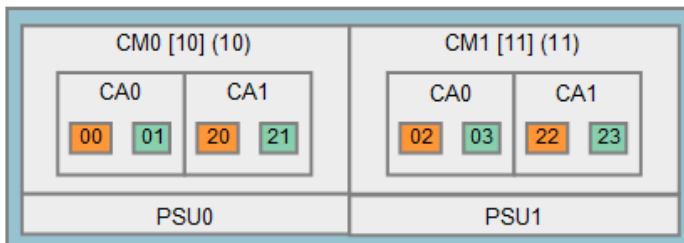
[ ]: Group No. ( ): Exchange unit No.  : adapter Port No.  : When using 2port-CA

When CA other than FC are installed in the basic host interface



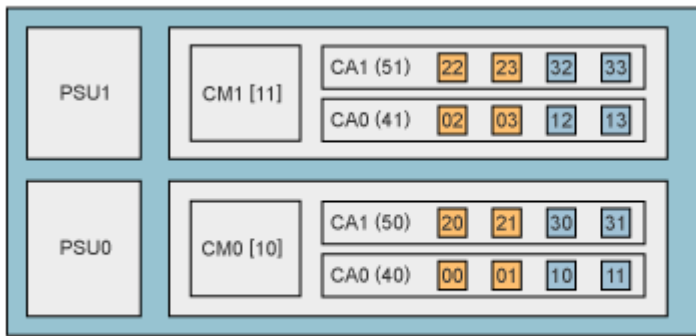
[ ]: Group No. ( ): Exchange unit No.  : adapter Port No.  : When using 2port-CA

**ETERNUS DX80 S2, ETERNUS DX90 S2, ETERNUS DX200 S3, ETERNUS DX200F rear view**



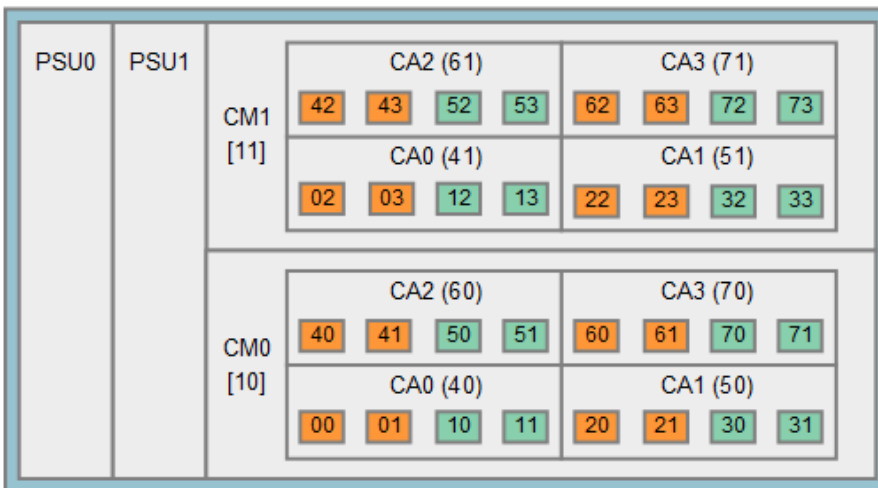
[ ]: Group No. ( ): Exchange unit No.  : adapter Port No.  : When using 2port-CA

**ETERNUS DX400 series rear view**



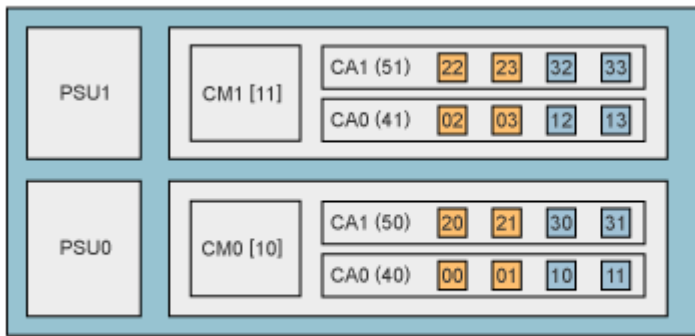
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

**ETERNUS DX400 S2 series, ETERNUS DX500 S3, ETERNUS DX600 S3 rear view**



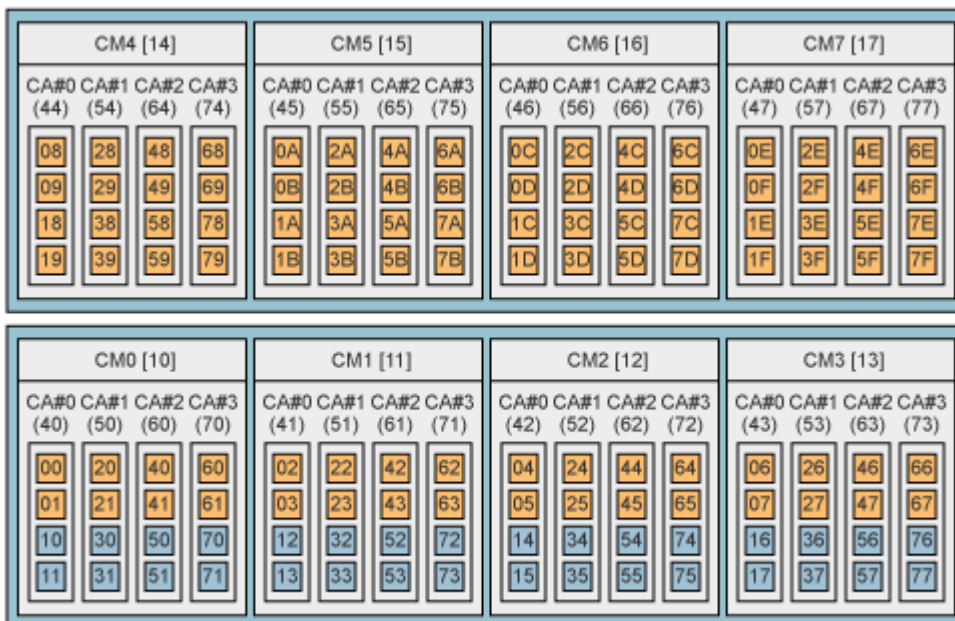
[ ] : Group No. ( ) : Exchange unit No.   : adapter Port No.   : When using 4port-CA

**ETERNUS DX8100 rear view**



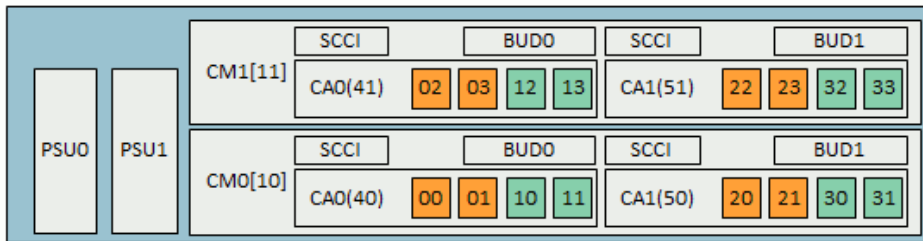
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

**ETERNUS DX8400, ETERNUS DX8700 front view**



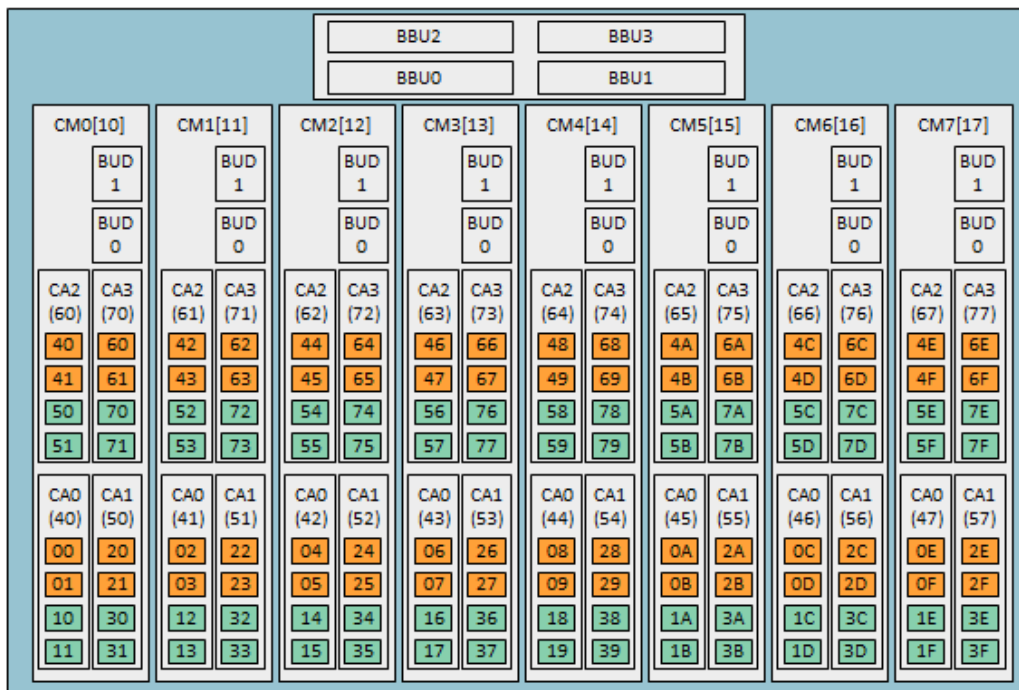
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

### ETERNUS DX8100 S2 rear view



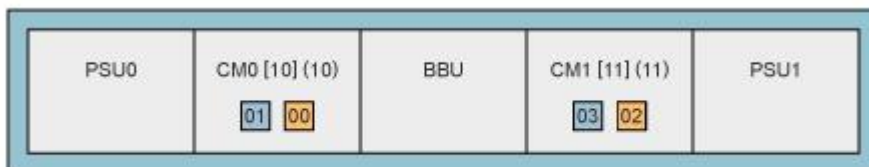
[ ]: Group No. ( ): Exchange unit No.  : adapter Port No.  : When using 4port-CA

### ETERNUS DX8700 S2 front view



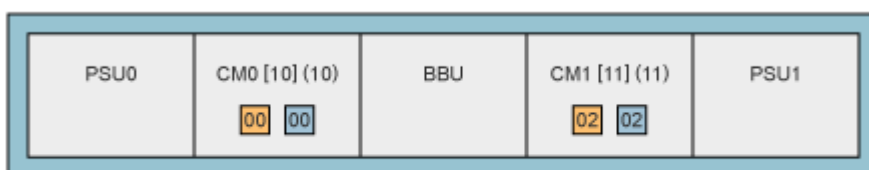
[ ]: Group No. ( ): Exchange unit No.  : adapter Port No.  : When using 4port-CA

### ETERNUS2000 rear view (FC, iSCSI connection)



[ ]: Group No. ( ): Exchange unit No.  : Adapter Port No.  : When using 2port-CA

### ETERNUS2000 rear view (SAS connection)

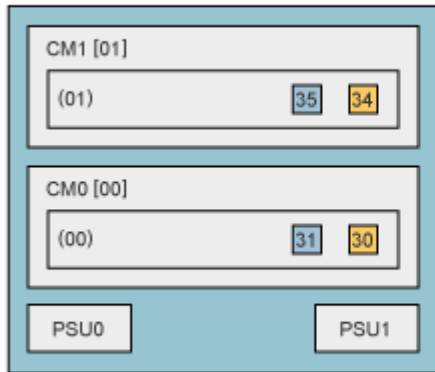


[ ]: Group No. ( ): Exchange unit No.  : Adapter Port No.  : When using 2port-CA

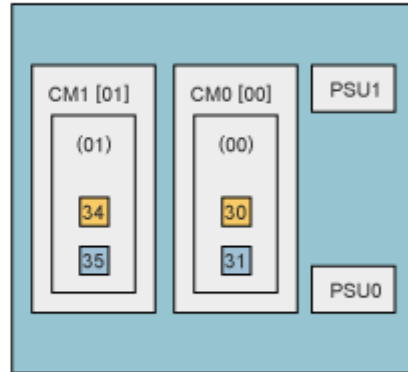


**ETERNUS4000 model 80, 100 rear view**

[ Rack mount ]

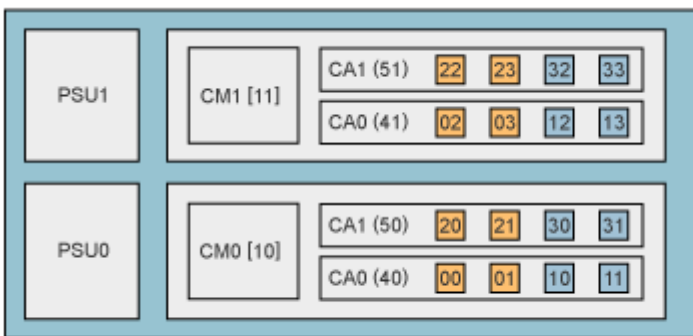


[ Pedestal ]



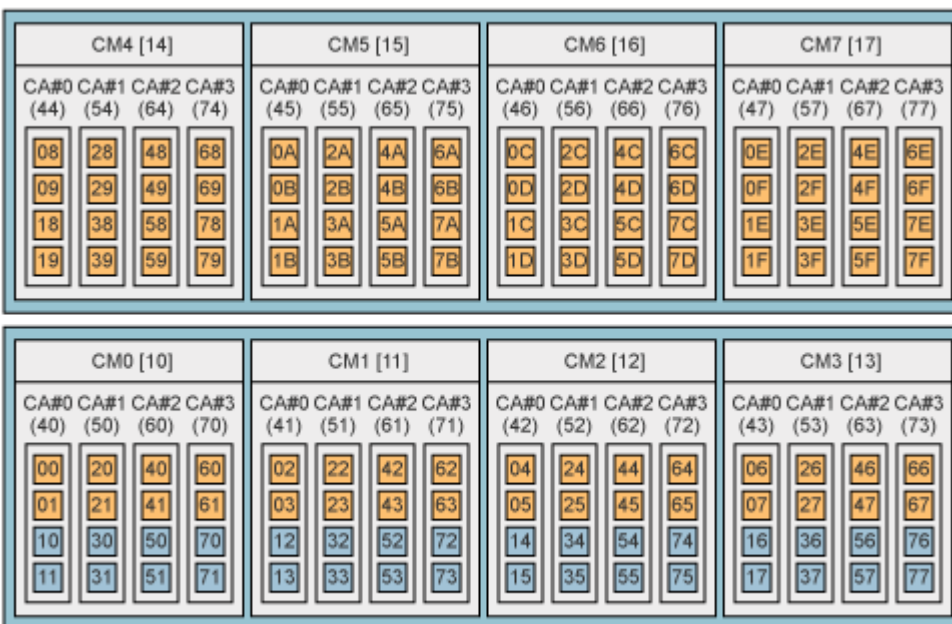
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 2port-CM

**ETERNUS4000 model 300, 400, 500, 600, ETERNUS8000 model 700, 800 rear view**



[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

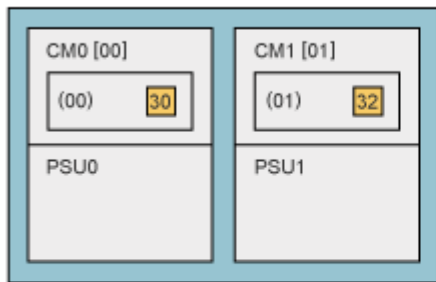
**ETERNUS8000 model 900, 1100, 1200, 2100, 2200 front view**



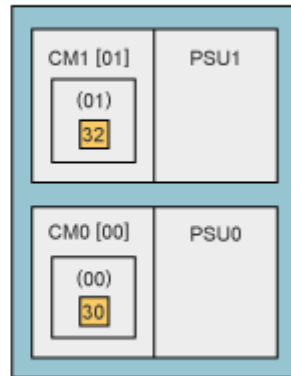
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

**ETERNUS3000 model 50 rear view**

[ Rack mount ]



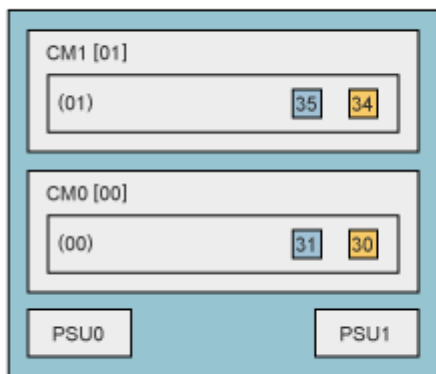
[ Pedestal ]



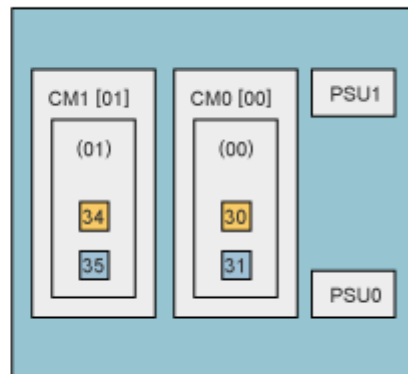
[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No.

**ETERNUS3000 model 80, 100 rear view**

[ Rack mount ]



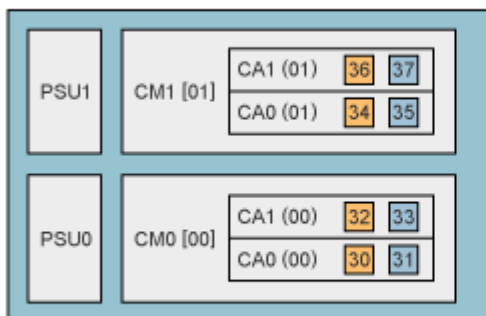
[ Pedestal ]



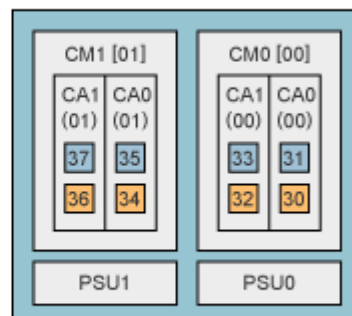
[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No. [ ] : When using 2port-CM

**ETERNUS3000 model 200, 300, 400, 500, 600, 700 rear view**

[ Rack mount ]



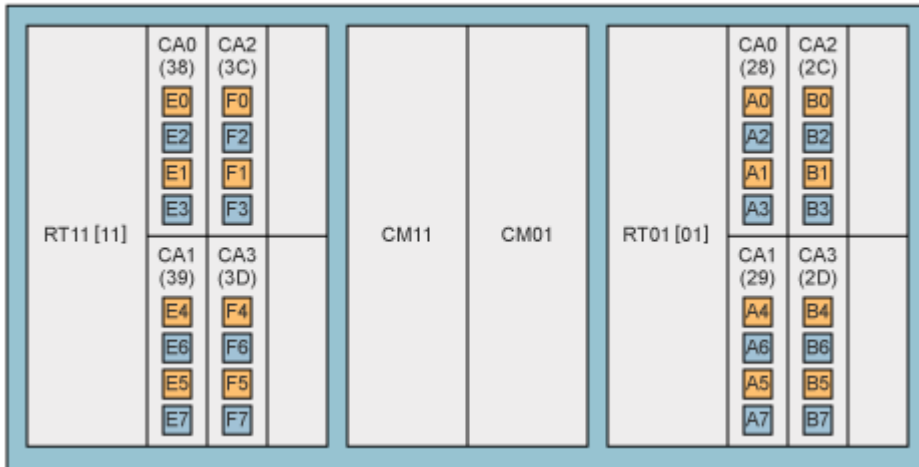
[ Pedestal ]



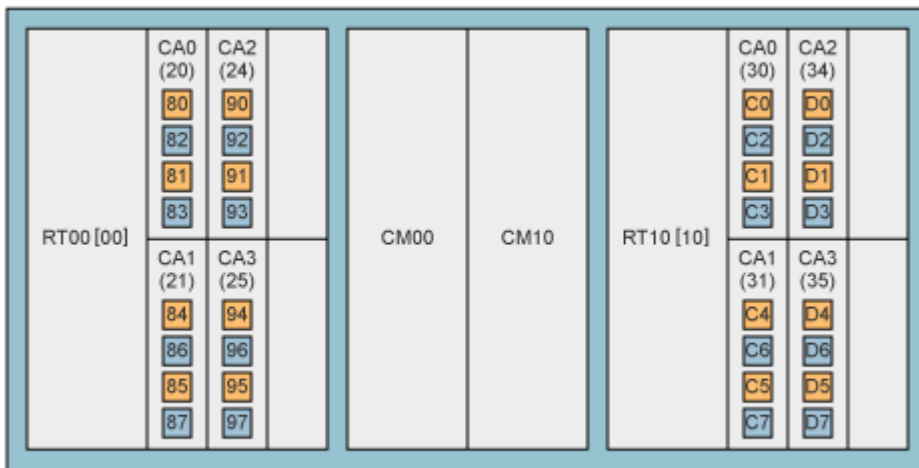
[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No. [ ] : When using 2port-CA

**ETERNUS6000 front & rear view**

[ Device Front ]



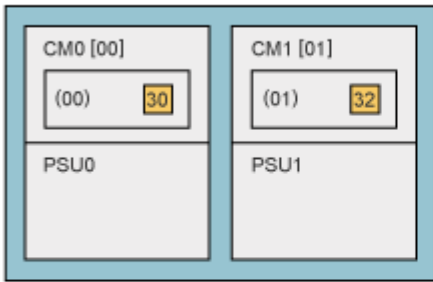
[ Device Rear ]



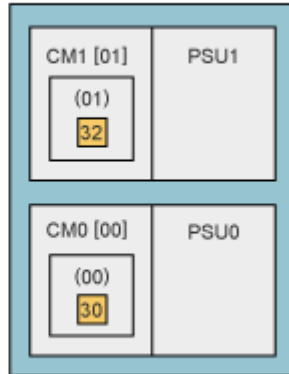
[ ] : Group No. ( ) : Exchange unit No.   : Adapter Port No.   : When using 4port-CA

### GR710 rear view

[ Rack mount ]



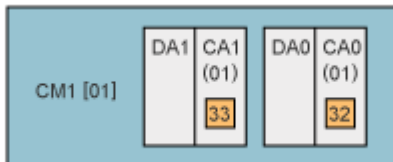
[ Pedestal ]



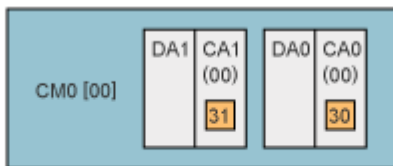
[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No.

### GR720 and GR730 rear view

[ Upper Compartment ]



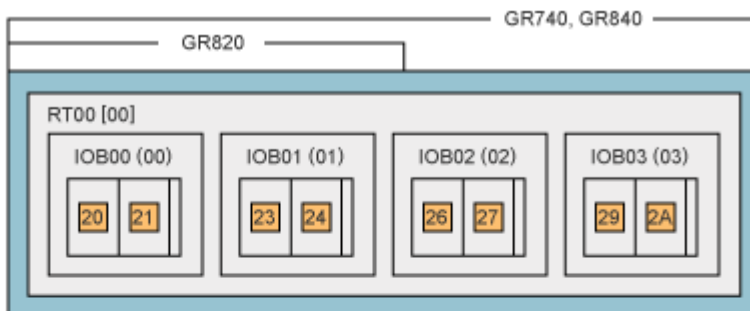
[ Lower Compartment ]



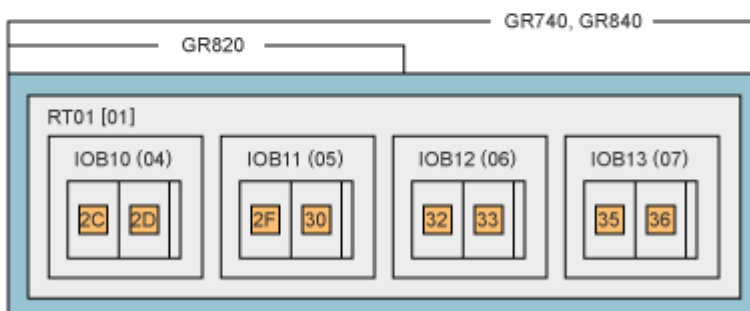
[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No.

### GR740, GR820, GR840 front & rear view

[ Device Front ]



[ Device Rear ]



[ ] : Group No. ( ) : Exchange unit No. [ ] : Adapter Port No.

## Assigned-/Non-assigned CM Type Disk Storage Systems

For ETERNUS disk storage systems, there are two system types: “Assigned-CM” and “Non-assigned-CM.” With Assigned-CM disk storage systems, the main access path for each LU is assigned to a particular controller. With Non-assigned-CM disk storage systems, there are no assigned LU access paths as such.

With “Assigned-CM” type disk storage systems, the path connected to the assigned controller is active. Paths to other controllers are on standby. With “Non-assigned-CM” type disk storage systems, all paths are active and used for access.

The table below shows the “Assigned-CM” and “Non-assigned-CM” disk storage systems.

Load balancing/Failover performance can differ depending on “Assigned-CM” and “Non-assigned-CM” use and the number of paths employed. For details, refer to the supplied product manual.

Assigned CM type	ETERNUS DX60, ETERNUS DX80, ETERNUS DX90, ETERNUS DX60 S2, ETERNUS DX80 S2, ETERNUS DX90 S2, ETERNUS DX100 S3, ETERNUS DX200 S3, ETERNUS DX200F, ETERNUS DX400 series, ETERNUS DX400 S2 series, ETERNUS DX500 S3, ETERNUS DX600 S3, ETERNUS2000, ETERNUS4000, ETERNUS3000, GR710, GR720, GR730
Non-assigned CM type	ETERNUS DX8000 series, ETERNUS DX8000 S2 series, ETERNUS8000, ETERNUS6000, GR740, GR820, GR840

## Change Unit of Disk Storage Systems

The `iompadm change/restart` command has a “change unit” parameter. The change unit represents a module of a disk storage system as follows.

Disk Storage System	cu/controllerunit	g/groupmodule
ETERNUS DX60, ETERNUS DX80, ETERNUS DX90, ETERNUS DX60 S2, ETERNUS DX80 S2, ETERNUS DX90 S2, ETERNUS DX100 S3, ETERNUS DX200 S3, ETERNUS DX200F, ETERNUS2000, ETERNUS4000 model 80, 100, ETERNUS3000	-	CM
ETERNUS DX400 series, ETERNUS DX400 S2 series, ETERNUS DX500 S3, ETERNUS DX600 S3, ETERNUS DX8000 series, ETERNUS DX8000 S2 series, ETERNUS4000 model 300, 400, 500, 600, ETERNUS8000	CA	CM
ETERNUS6000	CA	ROUTER
GR740, GR820, GR840	IOB	ROUTER
GR710, GR720, GR730	-	CM

When a CA of ETERNUS6000 is exchanged, the change unit must be `cu` or `controllerunit`. When a CM of ETERNUS3000 is exchanged, the change unit must be `g` or `groupmodule`.

## Setting of Max Throttle value

When connecting to the following disk storage systems, please set the Max Throttle value with `mpdconfig -m` command. For detailed operation, please refer to a software information.

ETERNUS2000  
 ETERNUS4000 model 80, 100  
 ETERNUS3000  
 ETERNUS GR series

## Linux Kernel and Multipath Driver Update

### Multipath Driver Update

Never use '-U' option of the rpm command. Please check a software information or a patch installation manual.

### How to Update Linux Kernel

Apply the latest patch of Multipath Driver  
Update the Linux kernel. If the update fails, refer to the next section.

### Recovery from Failure of Linux Kernel Update

When Linux kernel update fails, follow the instructions below.

Run the "mpdsetup" command with fjmkernel option as root user.

```
# /opt/FJSVmpd/system/mpdsetup fjmkernel
```

If using grub as the boot loader, check the setting.  
(grub is generally used on x86 architecture or EM64T architecture)

If using Red Hat Enterprise Linux v.4, check the /boot/grub/grub.conf file. When there is not an initrd line corresponding to the title line, add the initrd line as follows.

Example: When you failed to apply 2.6.9-42.ELsmp kernel

```
[before correction]
    title Red Hat Enterprise Linux AS (2.6.9-42.ELsmp)
        root (hd0,0)
        kernel /vmlinuz-2.6.9-42.ELsmp ro root=LABEL=
```

```
[after correction]
    title Red Hat Enterprise Linux AS (2.6.9-42.ELsmp)
        root (hd0,0)
        kernel /vmlinuz-2.6.9-42.ELsmp ro root=LABEL=
        initrd /initrd-2.6.9-42.ELsmp.img  <- Add this line!
```

Then, set the above kernel as default kernel of grub.

Apply the kernel update again.

Run the "mpdsetup" command.

```
# /opt/FJSVmpd/system/mpdsetup
```

Reboot the server

### WARNING Message During Linux Kernel Update

The following message might be displayed when updating the Linux kernel on Red Hat Enterprise Linux AS v.4, Red Hat Enterprise Linux ES v.4 or Red Hat Enterprise Linux 5. Please ignore the message.

```
WARNING: No module mpdh found for kernel XXXXX, continuing anyway
(XXXXX: kernel version)
```

## Recovery from Failure of Update to Red Hat Enterprise Linux 5.5

OS doesn't start when updating it to Red Hat Enterprise Linux 5.5 in the following conditions.

- 1.The Multipath Driver before V2.0L14 is installed in the Red Hat Enterprise Linux 5.5
- 2.The environment that uses the Multipath Driver before V2.0L14 is updated to Red Hat Enterprise Linux 5.5.
- 3.The environment that uses the Multipath Driver that applies the following patches is updated to Red Hat Enterprise Linux 5.5.

Red Hat Enterprise Linux 5.5 (for x86) : Patch before T000972LP-09  
Red Hat Enterprise Linux 5.5 (for Intel64) : Patch before T000973LP-09  
Red Hat Enterprise Linux 5.5 (for Intel Itanium) : Patch before T000971QP-09

Please follow the instructions below to recover from the failure. ( Please prepare installation CD1 of Red Hat Enterprise Linux 5.5 and product CD of Multipath Driver V2.0L20 or later.)

Set installation CD1 of Red Hat Enterprise Linux 5.5 to the drive, and start the server.

Input to the boot prompt as "linux rescue", and boot up a system in the rescue mode.

"Selection of the language" and "Selection of the keyboard" screen are displayed, and select the item corresponding to the environment.

"Setting of the network" screen is displayed, and select "no".

"Selection of the method of the mount" screen is displayed, and select either following methods.

"Continue" is selected.:automatic mount to /mnt/sysimage is done.

"skip" is selected. manual mount to /mnt/sysimage,after the shell starts.

Execute/usr/sbin/chroot command after the shell starts, and change the root directory.

```
# /usr/sbin/chroot /mnt/sysimage
```

In case /boot partition etc. are set besides/root partition, execute the mount command for those partitions.

Take out installation CD1 of Red Hat Enterprise Linux 5.5, and exchange it for product CD of Multipath Driver V2.0L20 or later.

Execute the mount command for product CD of Multipath Driver V2.0L20 or later.

For instance, it becomes the following when the device of the CD drive is /dev/hda.

```
# mount /dev/hda /media
```

Move to the CD, and install Multipath Driver V2.0L20 or later by the mdpkgadd command.

```
# cd /media  
# ./mpdpkgadd
```

Move to the root, and take out product CD of Multipath Driver V2.0L20 or later after unmounting.

```
# cd /  
# umount /media
```

Execute exit twice, and end the chroot environment and the rescue mode. The server reactivates by the automatic operation after the rescue mode ends.

```
# exit  
# exit
```



## Notes

### FC Switch

When using Multipath Driver with FC switches, zoning settings must be defined. For the details of setting zones, please refer to the manual of FC switches.

### Setting of qla2xxx driver

When downloading and installing the qla2xxx driver from the QLogic Corp. web-site, the following two lines may appear in the "/etc/modprobe.conf" file. They must be commented out. Add "#" to the beginning of the following two lines to comment them out, and install Multipath Driver. If Multipath Driver has already been installed, run the "/opt/FJSVmpd/system/mpdsetup" command after commenting them out.

```
install qla2xxx /sbin/modprobe qla2xxx_conf; /sbin/modprobe --ignore-install qla2xxx
remove qla2xxx /sbin/modprobe -r --first-time --ignore-remove qla2xxx && { /sbin/modprobe -r --ignore-remove
qla2xxx_conf; }
```

### iSCSI

When iSCSI interface is used to connect disk storage systems, please set the iSCSI timer using the iscsiadm command.

Please refer to the guide of the storage system for details concerning the use of iSCSI initiator.

Please confirm whether the iSCSI timer is correctly set to 25 seconds by the following command.

```
# iscsiadm -m node -p [IP of target] -o show | grep timeo.replacement_timeout
```

Example: When you confirm the timer of target IP 192.168.10.189

```
# iscsiadm -m node -p 192.168.10.189 -o show | grep timeo.replacement_timeout
```

Please execute the following command to set the timer to 25 seconds if the timer is not set to 25 seconds

```
# iscsiadm -m node -p [IP of target] -o show | grep timeo.replacement_timeout -v 25
```

Example: When you set the timer of target IP192.168.10.189 to 25 seconds

```
# iscsiadm -m node -p 192.168.10.189 -o update -n node.session.timeo.replacement_timeout -v 25
```

Please reboot OS when you set the iSCSI timer.

```
# shutdown -r now
```

## Notes when Multipath is Composed

Please connect the HBA in the server and the disk array device as there is a redundancy.  
 For instance, please use CM0 and CM1 of ETEURNUS DX400 series to configure multipaths.  
 Moreover, it is necessary to consider even number/odd number of CM for the disk array device with three CMs or more such as ETEURNUS DX8000 series.  
 Contact a Fujitsu engineer for details.

## LU Configuration

The LU number has to be allocated from 0 in ascending order, and the LU configuration of each port that configure a multipath has to be equal.  
 When setting LUN Mapping, Affinity Group or Zone, please set it in the above condition. When not setting LUN Mapping, Affinity Group or Zone on ETERNUS3000, ETERNUS4000 model 80, 100, GR710, GR720 or GR730, please check a logical volume number is from 0 in ascending order. Please refer to the manual of ETERNUS disk storage system for the details of how to set LUN Mapping, Affinity Group or Zone and how to check a logical volume number.

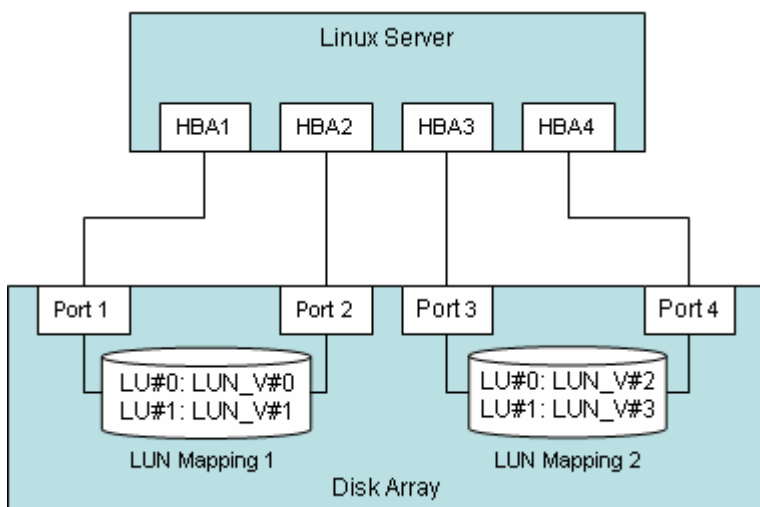
## Multiple LUN Mappings Configuration

### 1. In the case of Multipath Driver V2.0L10 or later

A server can recognize multiple LUN Mappings, Affinity Group or Zones set in a disk storage system.

Example of Multiple LUN Mappings Configuration:

2 paths to the LUN Mapping 1 and 2 paths to the LUN Mapping 2 are correctly configured.



#### LUN Mapping 1

The logical volume (LUN\_V) #0 is mapped on LU#0, and the logical volume (LUN\_V) #1 is mapped on LU#1.

#### LUN Mapping 2

The logical volume (LUN\_V) #2 is mapped on LU#0, and the logical volume (LUN\_V) #3 is mapped on LU#1.

### 2. In the case of Multipath Driver V2.0L03 or earlier

“Multiple LUN Mappings Configuration” is not supported. Multipath Driver V2.0L03 or earlier can recognize up to 256 LUs per disk storage system. A server where Multipath Driver V2.0L03 or earlier is installed can recognize up to 702 LUs which include internal SCSI disks, disk storage system and so on. (Available device names are from /dev/sda to /dev/sdzz.) Multipath Driver V2.0L10 or later doesn't have such a limitation.

## Expansion, Reduction and Replacement of Disk Storage Systems

If expansion, reduction or replacement of disk storage systems is performed on a system where Multipath Driver V2.0L03 or earlier is running, follow the procedure below. For detailed operation, please refer to a software information or a patch installation manual.

Make a variable-recognition-order initrd

A variable-recognition-order initrd was already made, go to the next step. But if any Multipath Driver patches were applied on the system, a variable-recognition-order initrd must be made.

Reboot a system using the variable-recognition-order initrd made in step 1

Change a boot loader setting to use the variable-recognition-order initrd made in step 1 and reboot a system.

Make a fixed-recognition-order initrd

Reboot a system using the fixed-recognition-order initrd made in step 3

Change a boot loader setting to use the fixed-recognition-order initrd made in step 3 and reboot a system.

If using Multipath Driver V2.0L10 or later, please refer to the "ETERNUS Multipath Driver V2.0 User's Guide for Linux".

## Hotplug of FC card on Red Hat Enterprise Linux 5.3 (for Intel Itanium)

The lpfc driver bundled with Red Hat Enterprise Linux 5.3 (for Intel Itanium) has a problem about hotplug. The problem is that hotplug procedure takes a lot of time. The problem has been resolved by the following version of the lpfc driver which is released by Fujitsu.

lpfc-fjstd-RHEL5-8.2.0.33.3p-2

lpfc-fjext-RHEL5-8.2.0.33.3p-2

lpfc-fjstd-RHEL5-xen-8.2.0.33.3p-2

lpfc-fjext-RHEL5-xen-8.2.0.33.3p-2

## Hotplug Procedure of FC card (dual port)

Update Multipath Driver to V2.0L10, Patch 5(T00812-05) or later in order to enable the hotplug of FC card (dual port) on Red Hat Enterprise Linux AS v.4 or Red Hat Enterprise Linux ES v.4. When each port of a FC card (dual port) is connected to disk storage system, perform the following procedure. If only one port of a FC card (dual port) is connected to disk storage system, perform as usual.

- adding a card

Follow the procedure of "PRIMEQUEST 500/400 SERIES REFERENCE MANUAL" Appendix B.5.2.1.

- deleting a card

In the step 1 of "PRIMEQUEST 500/400 SERIES REFERENCE MANUAL" Appendix B.5.2.2, execute 'iompadm change adapter' and 'iompadm del' command for each port, then go to step 2.

- swapping a card

In the step 1 of "PRIMEQUEST 500/400 SERIES REFERENCE MANUAL" Appendix B.5.2.3, execute 'iompadm change adapter' and 'iompadm del' command for each port, then go to step 2.

## udev Configuration

When you use the udev function for the device which is controlled by the Multipath Driver, please use by-id names. Because the udev function is formally supported by Red Hat Enterprise Linux AS v.4 Update4 or later and Red Hat Enterprise Linux ES v.4 Update4 or later, apply Update4 or later to your system to use the udev function. Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, SUSE Linux Enterprise Server 10 SP1 and SUSE Linux Enterprise Server 11 SP1 support by-id names from the first release.

### 1. Setting

#### 1.1 Setting of ETERNUS disk storage systems.

To use by-id names, the firmware version of ETERNUS disk storage systems should be equal to or later than that of the following table. When earlier version is used, please update the firmware.

Product Name	Version of the firmware
ETERNUS4000 model 80, 100	V30L11
ETERNUS4000 model 300, 500	V10L53
ETERNUS8000 model 700, 900, 1100, 2100	V10L53
ETERNUS3000 model 80, 100 (Product ID: E308xxxA, E308xxxA1, E310xxxA, E310xxxB, E310xxxB1)	V20L61
ETERNUS3000 model 80, 100 (Product ID: E308xxxD, E310xxxD)	V30L11
ETERNUS3000 model 200, 400, 600	V20L61
ETERNUS3000 model 300, 500, 700	V10L23
ETERNUS3000 model 300, 500, 700 (Product ID: E330xxxA, E330xxxB, E330xxxD, E350xxxA, E350xxxB, E350xxxD, E370xxxA, E370xxxB, E370xxxD)	V20L30
ETERNUS6000 all models	V30L10
Other ETERNUS disk storage systems	All versions are available for by-id names

After checking the firmware version of ETERNUS disk storage system, perform the following setting. Please refer to the manual of ETERNUS disk storage system for details.

In the case of ETERNUS4000 model 80, 100 and ETERNUS3000, select 'Type 01 & 03' as a value of 'Inquiry Command Page 83' in 'Append/Delete Host Response Pattern(s)' page.

In the case of ETERNUS6000, select 'type1 + type3' as a value of 'response data type for Inquiry PageCode 0x83' in 'Set Host Response' page.

## 1.2 Setting of Linux server.

In the case of Red Hat Enterprise Linux 5 or later and Red Hat Enterprise Linux 6 or later, by-id names can be used in default setting.

In the case of SUSE Linux Enterprise Server 10 SP1 or later and SUSE Linux Enterprise Server 11 SP1 or later, by-id names can be used in default setting.

In the case of Red Hat Enterprise Linux AS v.4 Update4 or later and Red Hat Enterprise Linux ES v.4 Update4 or later, in the '/etc/scsi\_id.config' file, change from 'options=-b' to 'options=-gu' and add the following lines to end of the file. Then reboot the server.

```
vendor=FUJITSU, model=ETERNUS_DXL, options=-p 0x83
vendor=FUJITSU, model=ETERNUS_DX400, options=-p 0x83
vendor=FUJITSU, model=ETERNUS_DX8000, options=-p 0x83
vendor=FUJITSU, model=E2000, options=-p 0x83
vendor=FUJITSU, model=E4000, options=-p 0x83
vendor=FUJITSU, model=E400A, options=-p 0x83
vendor=FUJITSU, model=E8000, options=-p 0x83
vendor=FUJITSU, model=E3000, options=-p 0x83
vendor=FUJITSU, model=E6000, options=-p 0x83
```

In the case of Red Hat Enterprise Linux AS v.4 Update2 or earlier and Red Hat Enterprise Linux ES v.4 Update2 or earlier on PRIMEQUEST, add the following lines to end of the '/etc/scsi\_id.config' file. Then reboot the server.

```
vendor=FUJITSU, model=E2000, options=-p 0x83
vendor=FUJITSU, model=E4000, options=-p 0x83
vendor=FUJITSU, model=E400A, options=-p 0x83
vendor=FUJITSU, model=E8000, options=-p 0x83
vendor=FUJITSU, model=E3000, options=-p 0x83
vendor=FUJITSU, model=E6000, options=-p 0x83
```

## 2. Correspondence between the by-id names and the usual /dev/sda type names

The by-id names are symbolic link to /dev/sdX name. So you can confirm relation between the by-id name and /dev/sdX name by executing the 'ls -l /dev/disk/by-id' command.

Example: Check the by-id name of /dev/sdb

```
# ls -l /dev/disk/by-id/
total 0
lrwxrwxrwx 1 root root 9 Dec 2 2006 scsi-3600e000000cb0000000000100000000 -> ../../sdb
lrwxrwxrwx 1 root root 9 Dec 2 2006 scsi-3600e000000cb0000000000100010000 -> ../../sdc
lrwxrwxrwx 1 root root 9 Dec 2 2006 scsi-3600e000000cb0000000000100020000 -> ../../sdd
```

The result shows that the by-id name of /dev/sdb is /dev/disk/by-id/scsi-3600e000000cb0000000000100000000.

## 3. Notice

When you use by-id names as device names of disks in a disk storage system, change all disk storage system related settings of OS and applications from /dev/sdX type names to by-id names.

If you use PRIMECLUSTER GDS, change Host Response setting before installing PRIMECLUSTER GDS. If you have already used PRIMECLUSTER GDS, don't change Host Response setting.

If sadump is used on PRIMEQUEST server, after changing the setting of ETERNUS, set the sadump again.

It isn't necessary to use the recognition order setting (fixed-recognition-order initial RAM disk), if by-id names are specified as the device names for all configuration file such as /etc/fstab.

## Notes in Linux KVM environment

It is necessary to do the following procedures in guest OS.

- Guest OS is Red Hat Enterprise Linux 6, and
- LU of the disk storage system is allocated on a virtual disk as IDE Disk for guest OS.

1. Please arrange "50- ide.rules" in/etc/udev/rules.d/directory.

Please set the following to "50- ide.rules".

```
ACTION=="add", SUBSYSTEM=="scsi", SYSFS{type}=="0", RUN+="/bin/sh -c 'echo 40 > /sys$$DEVPATH/timeout'"
```

2. Please reboot guest OS.

#### About This Installation Information

This Installation Information is devoted to providing technical information and an overview of the basic facilities of Multipath Driver. The contents of this document may be modified without any prior notice. Please contact FUJITSU LIMITED if you find any error in descriptions.

FUJITSU LIMITED is not responsible for indemnity that might be caused by the contents in this documentation or any damage related to contents in this documentation.

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